

Results of Contaminated Sediment Cleanups:

Experience to Inform Future Remedy Decisions

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Overview of Scenic Hudson Reports

Cleanup Methods

- Available dredges**

- Mitigation techniques**

- Sediment handling/disposal**

- Alternatives to dredging**

Cleanup Experience

- Remedy selection trends**

- Sediment resuspension data**

- Sediment and fish contamination data**

- Case studies**

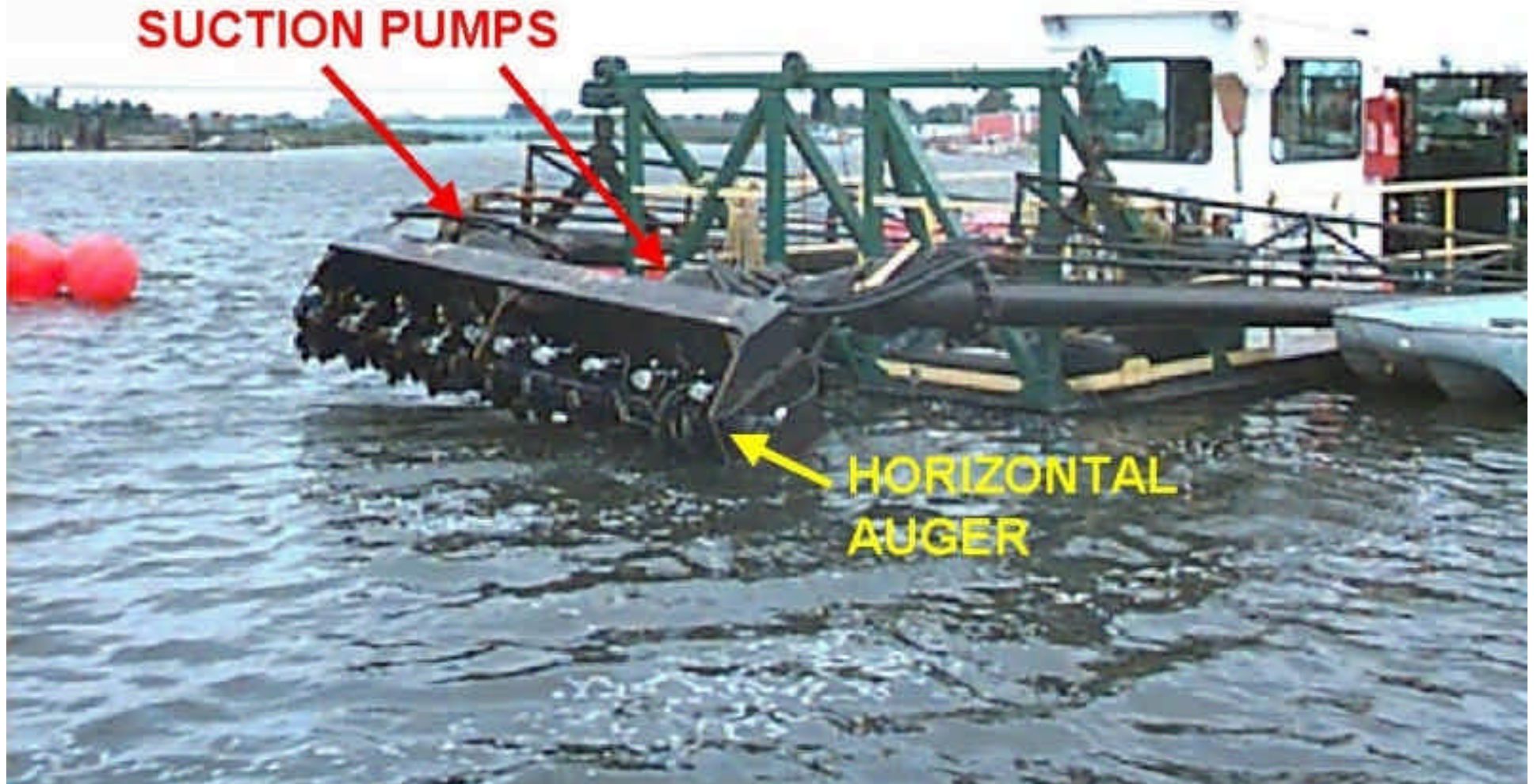
Feasibility

- Dredging decision factors**

- Applicability to the Hudson**

SUCTION PUMPS

**HORIZONTAL
AUGER**



Review of Remedy Decisions

Identified 101 contaminated sediment projects at 88 sites in the U.S.

Analyzed 89 complete, ongoing, and planned cleanups

Contaminants of concern

General remedial approach

Removal method

Treatment/disposal

Sediment volume

Review of Remedies - Removal

Removal most common approach (88%)

>66 removals complete or underway

Five cleanups >100,000 yd³ complete

Much larger cleanups are planned

Trend toward more and larger cleanups

Review of Remedies - Removal

Removal methods

66% dredging

27% dry excavation

6% wet excavation

**Most (51%) use conventional
hydraulic dredges**

Innovative dredges uncommon

**Operation modified for environmental
dredging**

Review of Remedies - Treatment/disposal

Treatment is uncommon

Upland disposal preferred (81%)

50% off site

29% on site

3% both



Contaminant Concentrations in Sediment Before and After Remediation, and Contaminant Mass Removal^{a,b}

Site	Concentration Before Remediation (ppm)	Concentration After Remediation (ppm)	Percent Reduction	Mass Removal
Grasse River, NY ^c	518	75	86%	98%
Lake Jarnsjon, Sweden	30.7	2.4	92%	97%
River Raisin, MI	6,510	9.7	>99%	na
Ruck Pond, WI	474	84	82%	96%
Sheboygan River, WI	640	39	94%	95%
St. Lawrence River, NY	200	9.2	95%	na
Fox River Deposit N, WI	16 to 130 ^d	14	13% to 89%	78%

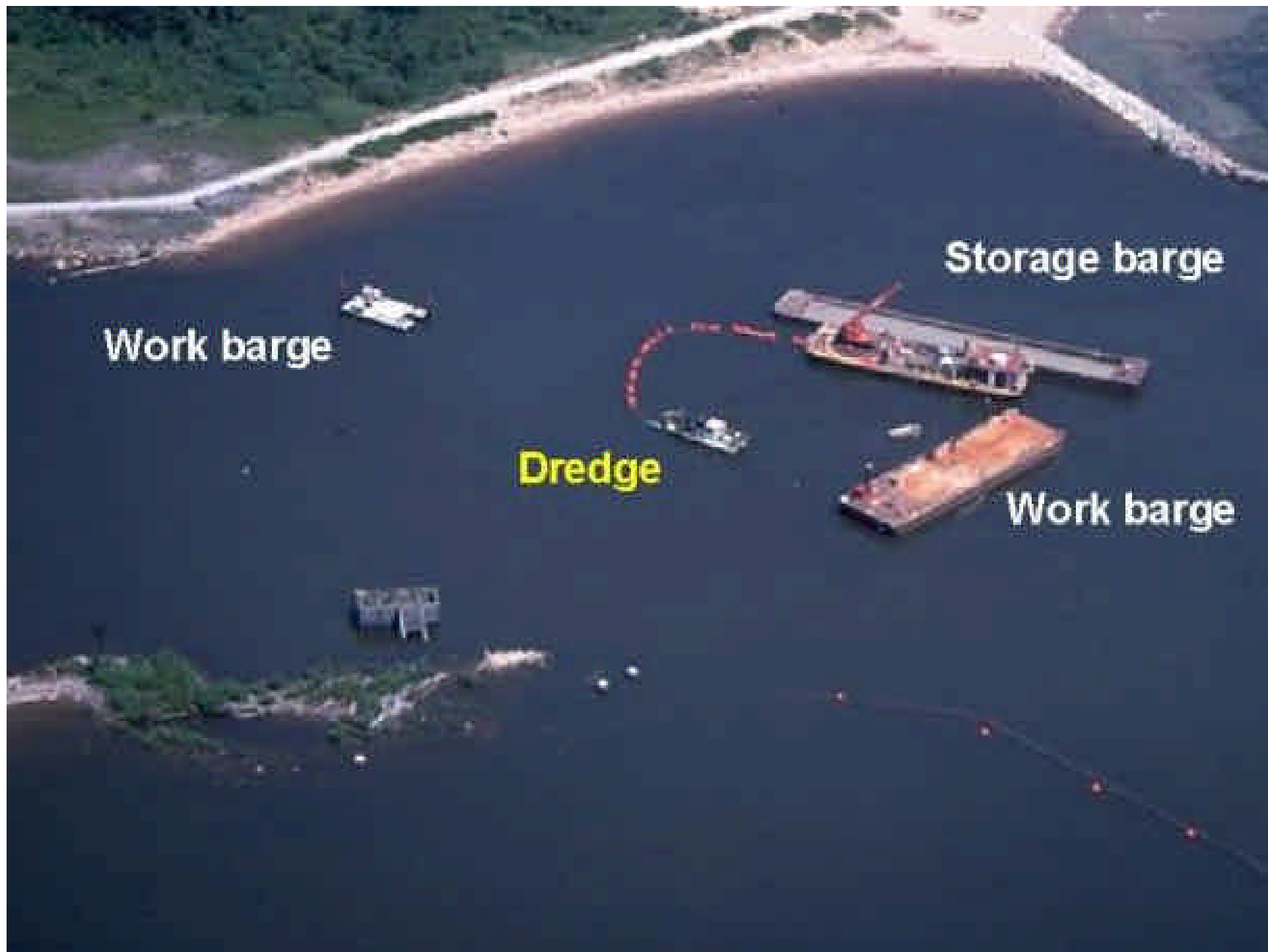
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^a All concentrations are site averages except for Lake Jarnsjon, which are maximum concentrations.

^b PCBs are the contaminants of concern at all sites.

^c Concentration are from the site documentation report (BBL, 1995). Mass removal is from Thibideaux (1999) cited in NRC (2001) . This source also reported average sediment concentrations were reduced by 53%.

^d Concentration range is based on the lowest and highest average values of six pre-dredging sampling studies between 1989 and 1998.



Contaminant Concentrations in Fish Before and After Remediation^{a,b}

Site	Concentration Before Remediation (ppm)	Concentration After Remediation (ppm)	Percent Reduction
Black and Bergholtz Creeks, NY	3.5E-05	5.0E-06	86%
Grasse River, NY	~11	~4	~64%
Lake Jarnsjon, Sweden	36	16	56%
Queensbury, NY (Yellow Perch) ^c	0.25 - 9.1	0.04	84% - 99%
Queensbury, NY (Small Mouth Bass) ^c	1.3 - 7.0	0.43	67% - 94%
Ruck Pond, WI	24	4.2	83%
Shiawassee River, MI	19	2.6	86%

^a All concentrations are averages.

^b PCBs are the contaminants of concern at all sites except TCDD at Black and Bergholtz Creeks.

^c Pre-cleanup concentrations measured in 1992 and 1993 differed widely. Data for both years are presented.



Conclusions

Cleanup Experience

At least 66 removal cleanups complete in U.S.

Dredging is the most frequent choice

Sediment and water handling/disposal well developed

Numerous equipment choices

Quality guidance available

Conclusions

Results Data

Cleanup monitoring should be expanded

Sediment and fish contamination reduced after cleanups

Sediment benefits exceed background attenuation

Short-term (<4 year) fish impacts seen at a couple of sites

Benefits are long-term